

AGRICULTURAL EDUCATION

Academic Content Standards are available at: <http://www.doe.in.gov/standards/agriculture.html>

Teacher Requirements are available at:
<http://doe.in.gov/dps/licensing/assignmentcode>

Introduction

Agricultural Education is an active part of the curriculum for many high schools in Indiana. This program area combines the home, the school, and the community as the means of education in agriculture. The courses provide students with a solid foundation of academic knowledge and ample opportunities to apply this knowledge through classroom activities, laboratory experiments and project applications, supervised agricultural experiences, and the FFA.

The vision and mission of Agricultural Education is: that all people value and understand the vital role of agriculture, food, fiber, and natural resource systems in advancing personal and global well-being; and that students are prepared for successful careers and a lifetime of informed choices in agriculture.

The goals for Agricultural Science and Business students focus on providing learning experiences that will allow them to:

- Demonstrate desirable work ethics and work habits.
- Apply the basic agricultural competencies and the basic background knowledge in agriculture and related occupations.
- Analyze entrepreneurial, business, and management skills needed by students preparing to enter agriculture and related occupations.
- Expand leadership and participatory skills necessary for the development of productive and contributing citizens in our democratic society.
- Gain effective social and interpersonal communication skills.
- Be aware of career opportunities in agriculture and set career objectives.
- Acquire job-seeking, employability, and job-retention skills.
- Advance in a career through a program of continuing education and life-long learning.
- Apply the basic learning skills in reading, writing, thinking, mathematics, communicating, listening, and studying.
- Recognize the interaction of agriculture with governments and economic systems at the local, state, national, and international levels.
- Recognize how new technologies impact agriculture and how agriculture impacts the environment.

It is important to understand and reaffirm that career-technical experiences do not preclude students from going on to higher education; in fact participation actually enhances the opportunity. A growing number of students are combining both college preparation and work-place experiences in their high school preparation. Agricultural Science and Business and the FFA programs have a long history of successfully preparing students for entry level careers and further education and training in the science, business and technology of agriculture. The

programs combine classroom instruction and hands-on career focused learning to develop students' potential for premier leadership, personal growth, and career success.

FFA

The FFA is the career and technical education student organization that is an integral part of the instruction and operation of a total agricultural education program. As an intra-curricular organization and essential component of the total program, the local agricultural education teacher(s) serve as the FFA chapter advisors. The many activities of the FFA parallel the methodology of the instructional program and are directly related to the occupational goals and objectives. As an integral part of the instructional program, district and state level FFA activities provide students opportunities to demonstrate their proficiency in the knowledge, skills, and attitudes they have acquired through the agricultural science and agricultural business total program. Agricultural education students demonstrating a high degree of competence in state level FFA activities are highly encouraged to represent their local communities, districts, and state by participating in national FFA activities.

Instructional activities of the FFA require participation of the agricultural science and agriculture business education students as an integral part of an agricultural education course of instruction and, therefore, may be considered an appropriate use and amount of the allotted instructional time.

Indiana Young Farmers' Association (IYFA)

The Indiana Young Farmers' Association was founded in 1962 and is dedicated to furthering the educational, social, and personal opportunities of all individuals interested or involved in the agricultural industry. It acts as an avenue for continuous educational experiences for adults, so that they can take full advantage of the possibilities available in the world of agriculture. IYFA supports the needs of agricultural-based, rural communities by providing worthwhile community services, effective leadership training, and wholesome social and recreational activities for the entire family through involvement in various local, state and national activities. It is the mission of the Young Farmer program to provide the opportunity to agriculturists to enter the industry as well as upgrade the skills needed to be leaders in their chosen occupation. Agriculture has become one of the most intense and technologically advanced industries in the world.

Middle School Course Titles and Descriptions

MIDDLE LEVEL EXPLORING AGRICULTURAL SCIENCE AND BUSINESS 0496 (GRADES 7 AND 8, OR GRADES 6, 7, AND 8)

The Agricultural Science and Business curriculum for middle level students follows the state standards of the Fundamentals of Agricultural Science and Business course. There is flexibility in content due to the length of the course offered locally. The primary objective is to introduce students to the dynamic industry of agriculture while gaining an awareness of the importance, impact, and diversity of careers in agricultural science and business. The content provides a hands-on exploratory, science-based approach to agriscience as well as providing a broad-

based coverage of horticulture, animal science, environmental science, biotechnology, agricultural economics, plant and soil science, and agricultural science and agribusiness tools and equipment.

High School Course Titles and Descriptions

ADVANCED LIFE SCIENCE, ANIMALS (L)

5070

(ALS ANIML)

CIP Code: 26.0701

Advanced Life Science, Animals, is a standards-based, interdisciplinary science course that integrates biology, chemistry, and microbiology in an agricultural context. Students enrolled in this course formulate, design, and carry out animal-based laboratory and field investigations as an essential course component. Students investigate key concepts that enable them to understand animal growth, development and physiology as it pertains to agricultural science. This course stresses the unifying themes of both biology and chemistry as students work with concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, evolution, ecology, and historical and current issues in animal agriculture. Students completing this course will be able to apply the principles of scientific inquiry to solve problems related to biology and chemistry in highly advanced agricultural applications of animal development.

- Suggested Grade Levels: 11-12
- Highly Recommended Prerequisite: Biology and Chemistry due to course content standards
- A two semester course, one credit per semester
- Fulfills a Core 40 Life Science requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas or counts as an Elective or Directed Elective for any diploma
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- Additional academic content standards: <http://www.indianaaged.org/AgEdStandards.htm>
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCrosswalk060317.pdf>

ADVANCED LIFE SCIENCE, FOODS (L)

5072

(ALS FOODS)

CIP Code: 01.1001

Advanced Life Science, Foods, is a standards-based, interdisciplinary science course that integrates biology, chemistry, and microbiology in an agricultural context. Students enrolled in this course formulate, design, and carry out food based laboratory and field investigations as an essential course component. Students understand how biology, chemistry, and physics principles apply to the composition of foods, food nutrition and development, food processing, and storage. Students completing this course will be able to apply the principles of scientific inquiry to solve problems related to biology, physics and chemistry the context of highly advanced agricultural applications of food.

- Highly Recommended Prerequisite: Biology and Chemistry due to course content standards
- A two semester course, one credit per semester

- Fulfills a Life Science or Physical Science requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas or counts as an Elective or Directed Elective for any diploma
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- Additional academic content standards: <http://www.indianaaged.org/AgEdStandards.htm>
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

ADVANCED LIFE SCIENCE, PLANTS AND SOILS (L)

5074

(ALS PLT/SL)

CIP Code: 26.0301

Advanced Life Science, Plants and Soils, is a standards-based, interdisciplinary science course that integrates the study of advanced biology, chemistry, and earth science in an agricultural context. Students enrolled in this course formulate, design, and implement agriculturally-based laboratory and field investigations as an essential course component. These extended laboratory and literature investigations focus on the chemical reactions of matter in living and nonliving materials while stressing the unifying themes of chemistry and the development of physical and mathematical models of matter and its interactions. Using the principles of scientific inquiry, students examine the internal structures, functions, genetics and processes of living plant organisms and their interaction with the environmental. Students completing this course will be able to apply the principles of scientific inquiry to solve problems related to both biology and chemistry in the context of highly advanced agricultural applications of plants and soils.

- Highly Recommended Prerequisite: Biology and Chemistry due to course content standards
- A two semester course, one credit per semester
- Fulfills a Core 40 Life Science requirement for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas or counts as an Elective or Directed Elective for any diploma
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- Additional academic content standards: <http://www.indianaaged.org/AgEdStandards.htm>
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

AGRIBUSINESS MANAGEMENT

5002

(AG BUS MGMT)

CIP Code: 01.0102

Agribusiness Management is a yearlong course that presents the concepts necessary for managing an agriculture-related business from a local and global perspective. Concepts covered in the course include: exploring careers in agribusiness, global visioning, applying E-commerce, risk management, understanding business management and structures, entrepreneurship, the planning, organizing, financing, and operation of an agribusiness, economic principles, credit, computerized record keeping, budgeting, fundamentals of cash flow, federal, state, property and sales tax, insurance, cooperatives, purchasing, the utilization of information technology in agribusiness, marketing agricultural products, developing a

marketing plan, advertising and selling products and services, understanding consumers and buying trends, agricultural law applications and employability skills.

- Suggested Grade Levels: 11-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher
- A two-credit/two-semester course.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

AGRICULTURAL MECHANIZATION

(AG MECH)

5088

CIP Code: 01.0201

Agricultural Mechanization is a yearlong, lab intensive course in which students develop an understanding of basic principles of selection, operation, maintenance, and management of agricultural equipment in concert with utilization of safety and technology. Topics covered include: small and large gas and diesel engine repair, power transfer systems including hydraulic, pneumatic and robotic systems, arc, metal fabrication such as MIG, TIG and SMAW welding, concrete, wood, metal, electricity and electronics, recirculating aquaculture systems, hydroponics systems, surveying, precision farming equipment, remote sensing technology and global positioning systems equipment, building agriculture related buildings and structures including greenhouses, tillage, planting, irrigation, spraying, grain and forage harvesting, feed and animal waste management systems, agricultural industry communications and customer relations, safety and safety resources, career opportunities in the area of agricultural mechanization and employability skills.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher
- A two-credit/two-semester course. This course can be offered for a second full year at an advanced level and may also be offered in a two or three hour block for four semesters with a maximum of twelve credit hours.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

ANIMAL SCIENCE

(ANML SCI)

5008

CIP Code: 01.0901

This course is a yearlong program that provides students with an overview of the field of animal science. Students participate in a large variety of activities and laboratory work including real and simulated animal science experiences and projects. Areas that the students study may be applied to both large and small animals. Topics to be addressed include: anatomy and

physiology, genetics, reproduction and biotechnology, nutrition, aquaculture, careers in animal science, animal health, meeting environmental requirements of animals, and management practices for the care and maintenance of animals.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of teacher.
- A two-credit/ two-semester course. This course can be offered for a second full year at an advanced level and may also be offered in a two or three hour block with a maximum of six credit hours.
- Animal Science may be offered as a small animal/large animal course and or include an advanced, local content specific application such as aquaculture.
- Fulfills a Life Science requirement for the General Diploma only or counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

FARM MANAGEMENT (FARM MGMT)

5022

CIP Code: 01.0104

Farm Management is a yearlong course that introduces students to the principles of farm organization and management with the utilization of technology. It covers the effects of good and poor management on a farm, economic principles, decision-making, methods for organizing and planning, getting started in the farming business, farm record keeping systems, risk management, and career opportunities in the field of farm management.

- Suggested Grade Levels: 11-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher
- A two-credit/two-semester course.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

FOOD SCIENCE (FOOD SCI)

5102

CIP Code: 01.0401

This course is a yearlong program that provides students with an overview of food science and its importance. Introduction to principles of food processing, food chemistry and physics, nutrition, food microbiology, preservation, packaging and labeling, food commodities, food regulations, issues and careers in the food science industry help students understand the role that food science plays in the securing of a safe, nutritious, and adequate food supply. A project-based approach is utilized along with laboratory, team building, and problem solving activities to enhance student learning.

- Suggested Grade Levels: 11-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher
- A two-credit/two-semester course.
- Fulfills a Life Science or Physical Science requirement for the General Diploma only or counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCrosswalk060317.pdf>

FUNDAMENTALS OF AGRICULTURAL SCIENCE AND BUSINESS

5056

(FUND AG BUS)

CIP Code: 01.0101

Fundamentals of Agricultural Science and Business is a yearlong course that is highly recommended as a prerequisite and foundation for all other agricultural classes. The nature of this course is to provide students with an introduction to careers and the fundamentals of agricultural science and business. Areas to be covered include: agricultural literacy, its importance and career opportunities, plant and soil science, environmental science, horticulture and landscape management, agricultural biotechnology, agricultural science and business tools and equipment, basic principles of and employability in the agricultural/horticultural industry, basic agribusiness principles and skills, developing leadership skills in agriculture, and supervised experience in agriculture/horticulture purposes and procedures. Student learning objectives are defined. Instruction includes not only agriculture education standards but many academic standards are included through the use of “hands-on” problem-solving individual and team activities.

- Suggested Grade Levels: 9 or by permission of teacher.
- Recommended Prerequisite: None
- A two-credit/two semester course. May be offered as year long course to 8th graders for high school credit.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCrosswalk060317.pdf>

HORTICULTURAL SCIENCE

5132

(HORT SCI)

CIP Code: 01.0603

Horticultural Science is a yearlong course designed to give students a background in the field of horticulture and its many career opportunities. It addresses the biology and technology involved in the production, processing, and marketing of horticultural plants and products. Topics covered include: reproduction and propagation of plants, plant growth, growth media, hydroponics, floriculture and floral design, management practices for field and greenhouse production, interior landscapes, marketing concepts, production of herbaceous, woody, and nursery stock, fruit, nut, and vegetable production, integrated pest management and

employability skills. Students participate in a variety of activities including extensive laboratory work usually in a school greenhouse.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher.
- A two-credit/two-semester course. This course can be offered for a second full year at an advanced level and may also be offered in a two or three hour block for four semesters with a maximum of twelve credit hours.
- Fulfills a Life Science requirement for the General Diploma only or counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

LANDSCAPE MANAGEMENT (LAND MGMT)

5136

CIP Code: 01.0605

Landscape Management is a yearlong course that provides the student with an overview of the many career opportunities in the diverse field of landscape management. Students are introduced to the procedures used in the planning and design of a landscape using current technology practices, the principles and procedures involved with landscape construction, the determination of maintenance schedules, communications, management and employability skills necessary in landscaping operations, and the care and use of equipment utilized by landscapers. Upon completion of the program plus learning and demonstrating other skills, students have the opportunity to receive an industry approved State Certificate of Mastery in Landscape Management.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: None
- A two-credit/two-semester course. This course can be offered for a second full year at an advanced level and may also be offered in a two or three hour block for four semesters with a maximum of twelve credit hours.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>

NATURAL RESOURCE MANAGEMENT (NAT RS MGMT)

5180

CIP Code: 03.0299

This course is a yearlong program that provides students with a background in natural resource management. Students are introduced to career opportunities in natural resource management and related industries, understanding forest ecology importance, recognizing trees and their products, tree growth and development, forest management, measuring trees, timber stand improvement and urban forestry, soil features, erosion and management practices, conservation

practices, water cycles, uses, quality standards, reducing water pollution, conducting water quality tests, watersheds, and its importance to natural resource management, hazardous waste management, native wildlife, waterfowl, wetlands, and fish management, topography map use, management of recreational areas, game bird and animal management, outdoor safety, and weather. “Hands-on” learning activities encourage students to investigate areas of environmental concern including: identification and management of ecosystems, natural succession identification, natural communities, recycling and management of waste in the environment, soil conservation management practices, land uses, and air quality.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: None
- A two-credit/two-semester course.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCrosswalk060317.pdf>

PLANT AND SOIL SCIENCE

(PLT SL SCI)

5170

CIP Code: 01.1102

Plant and Soil Science is a yearlong course that provides students with opportunities to participate in a variety of activities including laboratory work. Topics covered include: the taxonomy of plants, the various plant components and their functions, plant growth, plant reproduction and propagation, photosynthesis and respiration, environmental factors affecting plant growth, integrated pest management plants and their management, biotechnology, the basic components and types of soil, calculation of fertilizer application rates and procedures for application, soil tillage and conservation, irrigation and drainage, land measurement, grain and forage quality, cropping systems, precision agriculture, principles and benefits of global positioning systems and new technologies, harvesting, and career opportunities in the field of plant and soil science.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business or by permission of the teacher
- A two-credit/two-semester course.
- Fulfills a Life Science requirement for the General Diploma only or counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- After a student completes the required Core 40 Science credits, this course may be used as an additional two science credits.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCrosswalk060317.pdf>

SUPERVISED AGRICULTURAL EXPERIENCE

(SAE)

5228

CIP Code: SAE Cooperative Education – Use CIP appropriate for training site

CIP Code: Non-Cooperative – Not funded by state but may be offered for credit

Supervised Agricultural Experience (SAE) is designed to provide students with opportunities to gain experience in the agriculture field(s) in which they are interested. Students should experience and apply what is learned in the classroom, laboratory, and training site to real-life situations. Students work closely with their agricultural science and business teacher(s), parents, and/or employers to get the most out of their SAE program. This course can be offered each year as well as during the summer session. SAE may be offered as a Cooperative Education Program. Curriculum content and competencies should be varied so that school year and summer session experiences are not duplicated.

- Suggested Grade Levels: 10-12
- Recommended Prerequisite: Fundamentals of Agricultural Science and Business
- Credits: A maximum of eight credits may be earned in this course when offered as a “non-co-op,” one hour course over eight semesters, some of which can be earned during summer sessions. Curriculum content and competencies should not be duplicated when multiple credits are being earned.
- Credits: A maximum of twelve credits may be earned in this course when offered as an SAE Cooperative Education course (one credit for related instruction and two credits for on the job training – over four semesters = 12 credit hours). On the job training credit hours may be increased in approved situations.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- A Career Academic Sequence, Career-Technical program, or Flex Credit course.
- State Additional Pupil Count (APC) vocational funding available if taught by appropriate Licensed Teacher <http://www.doe.in.gov/octe/pdf/CIPCcrosswalk060317.pdf>